

Claims

1. (Amended) An alternating current type surface-
discharge plasma display panel comprising a facing pair
of substrates and a plurality of ribs interposed between
5 the substrates so as to form a plurality of spaces,

the plurality of spaces being provided with a
phosphor layer and filled with discharge gas, so as to form
a plurality of discharge spaces,

inside each of the discharge spaces, plural pairs of
10 display electrodes covered by a dielectric layer being
provided,

the plasma display panel performing displaying by the
following steps: 1) writing by an accumulation of electric
charge in the dielectric layer, 2) applying a predetermined
15 sustaining voltage between the pairs of display
electrodes, 3) glow-discharging in selected discharge
spaces in which the electric charge has been accumulated
in the dielectric layer, and 4) converting ultraviolet
light resulting from the glow-discharge into visible light
20 by means of the phosphor layer,

wherein the dielectric layer is made by laminating
at least two different dielectric materials,

and wherein a panel structure is set such that an
equivalent electric field strength of 37V/cm · Pa or more

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is generated in the selected discharge spaces, when the
predetermined sustaining voltage is applied.

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2. The plasma display panel of Claim 1,

wherein the discharge gas contains xenon, and the ultraviolet light contains more amount of xenon molecular line than an amount of xenon resonance line on the spectrum.

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3. (Amended) An alternating current type surface-discharge plasma display panel comprising a facing pair of substrates and a plurality of ribs interposed between the substrates so as to form a plurality of spaces,

the plurality of spaces being provided with a phosphor layer and filled with discharge gas, so as to form a plurality of discharge spaces,

inside each of the discharge spaces, plural pairs of display electrodes covered by a dielectric layer being provided,

the plasma display panel performing displaying by the following steps: 1) writing by an accumulation of electric charge in the dielectric layer, 2) applying a predetermined sustaining voltage between the pairs of display electrodes, 3) glow-discharging in selected discharge spaces in which the electric charge has been accumulated in the dielectric layer, and 4) converting ultraviolet light resulting from the glow-discharge into visible light by means of the phosphor layer,

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wherein an amount of xenon contained in the discharge

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gas and filling pressure of the discharge gas, a gap between the display electrodes, and a thickness and a permittivity of the dielectric layer are set so that an equivalent electric field strength of 37V/cm·Pa or more is generated in the selected discharge spaces, when the predetermined sustaining voltage is applied.

4. The plasma display panel of Claim 3,

wherein xenon contained in the discharge gas is in a range of 5% to 90 % inclusive.

5. The plasma display panel of Claim 4,

wherein the filling pressure of the discharge gas is in a range of 66.5KPa to 200KPa inclusive.

6. The plasma display panel of Claim 3,

wherein the thickness of the dielectric layer is in a range of 3 μ m to 5 μ m inclusive, at a point where a pair of the display electrodes are opposing each other.

7. (Amended) The plasma display panel of Claim 6,

wherein the constant of the dielectric layer is 6 or more and less than 9.

8. (Delete)

9. The plasma display panel of Claim 3, 4, 5, 6, or 7,
wherein the distance between the pairs of display
electrodes is in a range of 20 μ m to 90 μ m inclusive, where
5 the display electrodes are facing the discharge spaces.

10. (Amended)

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7 An alternating current type surface-discharge plasma
display panel comprising a first plate and a second plate
10 disposed parallel to each other, with a plurality of ribs
interposed between the two plates so as to form a plurality
of spaces,

the first plate having, on an inner surface, plural
pairs of display electrodes covered by a dielectric layer,

15 the second plate having, on an inner surface, a
plurality of address electrodes,

the first plate and the second plate being disposed
in such a manner that the display electrodes cross over
the address electrodes,

20 each of the plurality of ribs being interposed
between adjacent address electrodes, and

each of the plurality of spaces being provided with
a phosphor layer and filled with discharge gas, so as to

form discharge spaces,

the plasma display panel performing displaying by the following steps: 1) accumulating electric charge in the dielectric layer by performing writing-discharge between the display electrodes and the address electrodes, 2) applying a predetermined sustaining voltage between the pairs of display electrodes, 3) glow-discharging in selected discharge spaces in which the electric charge has been accumulated in the dielectric layer, and 4) converting ultraviolet light resulting from the glow-discharge into visible light by means of the phosphor layer,

wherein a panel structure is set such that an equivalent electric field strength of $37\text{V/cm} \cdot \text{Pa}$ or more is generated in the selected discharge spaces, when the predetermined sustaining voltage is applied.

11. (Amended).

An alternating current type surface-discharge plasma display panel comprising a first plate and a second plate disposed parallel to each other, with a plurality of ribs interposed between the two plates so as to form a plurality of spaces,

the first plate having, on an inner surface, plural pairs of display electrodes covered by a dielectric layer,

the second plate having, on an inner surface, a plurality of address electrodes,

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the first plate and the second plate being disposed in such a manner that the display electrodes cross over the address electrodes,

each of the plurality of ribs being interposed
5 between adjacent address electrodes, and

each of the plurality of spaces being provided with a phosphor layer and filled with discharge gas, so as to form discharge spaces,

the plasma display panel performing displaying by the
10 following steps: 1) accumulating electric charge in the dielectric layer by performing writing-discharge between the display electrodes and the address electrodes, 2) applying a predetermined sustaining voltage between the pairs of display electrodes, 3) glow-discharging in
15 selected discharge spaces in which the electric charge has been accumulated in the dielectric layer, and 4) converting ultraviolet light resulting from the glow-discharge into visible light by means of the phosphor layer,

wherein an amount of xenon contained in the discharge
20 gas and filling pressure of the discharge gas, a gap between the display electrodes, and a thickness and a permittivity of the dielectric layer are set so that an equivalent electric field strength of $37\text{V/cm} \cdot \text{Pa}$ or more is generated in the selected discharge spaces, when the predetermined

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sustaining voltage is applied.

12. The plasma display panel of Claim 11,
wherein xenon contained in the discharge gas is in a
5 range of 5% to 90 % inclusive.

13. The plasma display panel of Claim 12,
wherein the filling pressure of the discharge gas is
in a range of 66.5KPa to 200KPa inclusive.

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14. The plasma display panel of Claim 10,
wherein the thickness of the dielectric layer is in a
range of 3 μ m to 5 μ m inclusive, at a point where a pair
of the display electrodes are opposing each other.

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15. (Amended) The plasma display panel of Claim 6,
wherein the constant of the dielectric layer is 6 or
more and less than 9.

20 16. (Delete)

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17. (Amended) The plasma display panel of Claim 11, 12,
13, 14

or 15,

wherein the distance between the pairs of display electrodes is in a range of 20 μ m to 90 μ m inclusive, where the display electrodes are facing the discharge spaces.

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18. The plasma display panel of Claim 11, 12, 13, 14, 15, or 16,

wherein the distance between the pairs of display electrodes is in a range of 20 μ m to 90 μ m inclusive, where the display electrodes are facing the discharge spaces.

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19. The plasma display panel of Claim 17, wherein forms of a pair of the display electrodes differ from each other.

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20. The plasma display panel of Claim 17, wherein at least one of a pair of the display electrodes has protrusions extending toward the other display electrode.

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21. The plasma display panel of Claim 19, wherein one or more protrusions are provided in each of the discharge spaces.

22. The plasma display panel of Claim 17,

wherein the display electrodes are metal electrodes,
and the permittivity of the dielectric layer is 6 or more
and 9 or less.

5 23. The plasma display panel of Claim 21,
wherein the dielectric layer is made by laminating
at least two different dielectric materials.

10 24. The plasma display panel of Claim 17,
wherein the display electrodes are made by stacking
bus lines on transparent electrodes, and the dielectric
layer is thicker on the bus lines than on the transparent
electrodes.

15 25. The plasma display panel of Claim 23,
wherein the dielectric layer is made of:
a first layer made of a first dielectric material
which covers the whole surface of the display electrodes
with a thickness in a range of $3\mu\text{m}$ to $25\mu\text{m}$ inclusive; and
20 a second layer made of a second dielectric material
which only covers parts of the first layer where there are
bus lines underneath.

26. (Amended) A display unit comprising the alternating

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~~current type surface-discharge~~ plasma display panel

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of Claim 1,2,3, 10, or 11, and a driving circuit for
applying voltage to every electrode included in the plasma
display panel.

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